M2M Pro 3 Family® - Quick Reference Guide

M2M Pro3® Family members (as M2M Pro3®, M2M Pro3 CONCENTRATOR®, M2M Pro3 WiFi®, M2M Pro3 IO®, MyGuard Hub®). These members are 3G/WiFi router, Zigbee/ISM gateway and Wireless MBus data concentrator devices with wired & wireless connection capabilities. The universal device works as and industrial computer with several multifunctional network services and supports a long list of wireless communication standards and installed applications.

Application modes: Can be used for private Security tasks & Safeguarding (as an advanced alarm center), Surveillance center for Home and Office (Video surveillance and ATM supervision), Home Automation and Intelligent Home tasks, Industrial applications (data collection, connecting devices), Monitoring (Base station & server monitoring, cash-registers), Smart Metering and AMI tasks, Telemetry, eHealth, Home & Office Internet sharing (ISP/3G+), Alternative DSL/ISP backup and advanced router functions.

The device has a common hardware platform which has four different hardware contexts as diverse modular constructions:

- M2M Pro3® - industrial 3G+ router device with Ethernet, USB interface
- M2M Pro3 CONCENTRATOR® - industrial 2G/3G+ router & data concentrator with wireless MBus capabilities and Ethernet, USB interface
- M2M Pro3 IO® - industrial 2G router device with M-Bus capabilities - wired RS232/RS485, Modbus and analog/digital IO interface
- M2M Pro3 WiFi / MyGuard Hub®- home & small business 3G+ router device & WiFi AP/HotSpot & ZigBee connection for sensors, meters

The router & concentrator builds up and sustain the communication bridge between the connected wireless devices (Short RF, ZigBee, WiFi, Wireless MBus) as sensors, meters and the remote center. Almost any kind of the short-range radio wireless devices can be connected to the router in the same time. It collects the information from the managed devices identify them then forward to an M2M-based central server through the secure mobile network (3G+ through an enclosed APN network).
The main goal of the router to connect the wired & wireless devices on the network, sentinel and assure the continuous network data traffic and unify the channels to integrate them into one info channel then forward the data towards the center.
The connected devices of the system makes a grid which could be utilized in many ways (like sharing the internet, receiving the information of sensors or measurement & consumer data or it can be used for information exchange, etc.). Through the collected and summarized information You'll able to offer real values like fresh information and value services for the home users, the industrial partners or the customers of the service providers.
Through the IO extensions it can connect to the several input lines and interfaces (like serial bus devices, MBus, analog & digital input/output lines). The wireless radio connections and wireless internet connection standards makes it able to connect industrial PLCs, analyzators, measurement devices, cameras, sensors, PCs, servers, network components, automates, etc. The built-in WiFi Hotspot and Access Point gives the possibility to share the mobile internet and ISP's internet line access for Your surround.
All redirected data and managed devices can be seen as evaluated data on the central server side or can be accessed by the web or a phone. It's possible to monitor the input lines, device health and their events & current status, signal changes. There You will be able to measure, track and control Your elements and able to receive alarms, measured values, status, life signals of all connected grid components.
The design of the router makes it possible to use it under continuous operation which guarantees high availability (HA) and reliability. It has remote management access function and which increases the efficiency of the present system with continous accessibility. It was developed for industrial conditions (robust design and cover which fits to the thermal conditions) and can be used with high quality and reliable cellular modules like a 2G/2.75G (GPRS or EDGE capable), or a 3.5G+ (HSxPA+) modem. The configuration is possible on the local webadmin interface or at the website. The operation LED signals of the router are easy to understand.

COMMUNICATION PROPERTIES

- **Wired Ethernet** (eth0 connection):
- Ethernet interface (All M2M Pro3 members) –10/100MBit, auto negot., half/full duplex, RJ45 connection
- **2G/3G** (ppp0 connection):
- 2G module option: Four-band GSM/GPRS module: **Cinterion TC63i** with board-2-board connection - operational modes: 850/900/1800/1900 MHz, GPRS Multislot Class 12 - DL/UL: 86 kbps
- 2.75G module option: Four-band GSM/GPRS/EDGE module: **Cinterion MC75i** with board-2-board connection - operational modes: 850/900/1800/1900/2100 MHz, GPRS & EDGE Multislot Class 12 – DL/UL: 86 kbps (GPRS), 236 kbps (EDGE)
- 3.5G module option: Dual-band GSM/GPRS/EDGE/UMTS/HSUPA/HSDPA module: **Cinterion EHS-5** with board-2-board connection – operational modes: 850/1900 (EHS5-US) or 900/2100MHz (EHS5-E) – GPRS & EDGE Class 12, HSDPA/HSUPA Class 6/8 – DL: up to 5.7 Mbps, UL: 7.2 Mbps, or Five-band HSDPA+ **Cinterion PH8** module with board-2-board connection - operational modes: 850/900/1800/1900/2100MHz – GPRS & EDGE Class 12, HSDPA/HSUPA Class 6/10 – DL: up to 5.7 Mbps, UL: 14.4 Mbps
- **Short RF** (Short RF radio freq. ISM signals):
- ISM module option (M2M Pro3 CONCENTRATOR®, MyGuard Hub®) – Texas CC1101 module @ 433/868 MHz, modular connection
- **Zigbee** (PAN network):
- Zigbee module option (M2M Pro3 CONCENTRATOR®, MyGuard Hub®) – Texas CC2531 module @ 2.4 GHz, modular connection
- **WiFi** (wlan connection):
- WiFi module (M2M Pro3 CONCENTRATOR®, MyGuard Hub®) – Realtek RTL8188CUS module @ 2.4 GHz, modular connection
- **External antennas** (dedicated antenna mounts for wireless standards)**:**
- 2G/3G antenna - Frequency range: 850-960MHz / 1710-1880 / 2100 MHz, Antenna interface: 50 Ohm, 2.2 dB or more, gained, Connector/mount: SMA
- ISM/Zigbee antenna - Frequency range: 850-960MHz / 1710-1880 / 2100 / 2400 MHz, Antenna interface: 50 Ohm, 2.2 dB gained, Connector/mount: SMA
- WiFi antenna - Frequency range: 850-960MHz / 1710-1880 / 2400 MHz, Antenna interface: 50 Ohm, 3 dB or more, gained, Connector/mount: SMA

MAIN FEATURES

- Built-in Powerful ATMEL ARM926-based Embedded MPU processor (400 MHz frequency, 400 MIPS, 32 bits ARM9 architecture)
- Wide range of memory fields (8Mbyte data flash, 64 MByte NAND flash, 128 MByte DDR2 RAM, external microSD card and USB stick/pendrive option) for storage of operation system and programms, configuration, logs, etc.
- High availability, realiability, high accuracy and stability, online operation
- Fail-safe operation (backup & recovery options, default & zero config, integrity check)
- Network connection auto check rebuild & auto repair (in case of 2G/3G network hangups and outages, in case of WiFi detection of comm. outages and auto recovery and AP, auto channel selection)
- Specialized 3G/WiFi router, WiFi Access Point/Hotspot, Zigbee/ISM gateway and Wireless MBus meter concentrator
- Forwards data of the connected devices and life signals to the remote center (transparental or filtered communication)
- Wired interfaces: 2xUSB, 1xminiUSB, 1xRS232*, 1xRS485*, Ethernet (RJ45), MBus*, Analog IO*, Digital IO* - *PTSM Terminal Block for M2M Pro 3 IO®
- Wireless connections: 2G, 3G, ISM radio, Zigbee, WiFi, Wireless M-Bus
- Powerful WiFi router (up to 254 connections) and Zigbee gateway (up to 230 connections), ISM concentrator (up to 254 connections)
- Communication ways: Ethernet (Eth0), WIFI Onboard LAN (Access Point/Hotspot) - IEEE 802.11b/g/n, PPP0 (2G/3G Internet) and WiFi Over Ethernet (for ISP internet sharing), Zigbee
- Network functionality: Router/Gateway, APN, ISP, NetID, TCP/IP, DHCP, NAT, Routing, Port forwarding, DynDNS, FTP Client/Server (for camera or other external devices), SNTP, WPA/WPA2-PSK, Netbios, SMPP (SMS handle and monitoring)
- VPN and Tunnelling: Simple VPN, PPTP Master/Client, IPSec, L2TP client/server
- Communication protocols: TCP, UDP – transparent or filtered, Modbus TCP master, Modbus RTU RS485 or RS232 interface, M-BUS master
- Security Tools: Firewall, MAC filtering, event logging (log files), operation logs, service logs, password protected admin login, data encryption (SSH, AES)
- External storage management & sharing: uSD memory card, USB pendrive, File Manager (Format, Mount/Unmount, Storage, etc.)
- WiFi security functions: WPA, WPA2-PSK, TKI+AES, MAC filtering, MAC cloning, disable WLAN radio
- Serial Connection (RS232) and Industrial connection (RS485), Wireless MBus support, specialized serial port settings
- Short RF ISM and Zigbee settings
- USB - Support for external storages (pendrives, disks, etc.)
- Real Time Clock (RTC) chip and coin cell battery for continuous time/calendar functions, receiving SNTP time and auto refresh
- Software: fast and secure, reliable customized special Linux distribution and software for industrial needs, local web administration for configuration and check the operation status (local web server and web UI, settings, parameters), status options: Operation, Interface and Connection status, logs, backup & restore config, etc.
- Intuitive web-based wizard-driven configuration (local Ethernet, remote by 2G/3G) and Quick Setup, all settings can be defined
- Remote control & management, Port settings, Command Line Interface (CLI)**
- Debug possibilities, watchdog, tcpdump, monitoring
- M2M server connection (central side: data collection & safe store, evaluation, visualization, web interface, event handling, reports, messaging, alarm sending)
- Signal transmission: in case of input signal change transmits the alarm signals. output line can be controlled by remotely*
- Backup lithium accumulator against outages, sabotage actions and Accu-Recharge function****
- Remote over-the-air software update function (FOTA from M2M server)
- Operation LEDs – up to the HW versions 3 LEDs*/*** or 8 LEDs****
- Integration of own developed softwares are also possible

INTERFACE CONNECTORS

Front side

1 – 12V power supply connector
2 – Operation LEDs
3 – Micro-SD memory slot
4 – Push-push insert SIM-card bay
5 – 2x USB v2.0 connector (Hi-Speed, 480 Mbps)
6 – mini-USB device connector (Hi-Speed)
7 – Reset config button
8 – Ethernet port, 10/100 MBit Auto NDX (RJ45)

Bottom side

9 – SMA antenna connectors (2G/3G, WiFi, Zigbee/ISM) – up to the HW version
10 – Serial port (RS232, fast, full duplexity)* - PTSM Terminal Block
11 – Industrial port (RS485,full dupl.)*-PTSM
12 – Modbus connector* - PTSM Terminal Bl.
13 – Digital input/output lines* - PTSM T. B.
14 – Analog input/output lines* - PTSM T. B.

POWER, CURRENT, ENVIRONMENTAL PROTECTION

- Power supply: 12 VDC / 1.2-3A, through 230V/12V power supply adapter
- Digital input line*: high level 2V, low level 1V, Digital output*: 0.3A / 125VAC; 1A / 30 VDC
- Analog input/output line*: 0V..10V (12bit), Current in active operation: 0mA..24mA (12bit)
- Rated current: stand-by current 385mA @12V, average current 640mA/940mA @12V, maximum current 1300mA @12V
- IP31 immunity protection
- Temperature limits: Operational between -40°C and +70°C, Storage temperature: between -40°C and+80°C, at 0 - 95% non-condensing humidity
  (Notes that water, icing, dewing not allowed, take care when temperature decreasing.)

TECHNICAL CONSTRUCTION AND DESIGN

- Dimensions (WxLxH): 215x138x50mm****/90x80x31mm***/104x104x31mm* (up to HW version), PCB only: 90 x 77 x 22mm
- The PCB circuit can be enclosed into an aluminum/plastic case with aluminum holder. The circuit can be fixed with four screws to a fixation point, the sealable cover can be fixed with four screws.
- CE certification and compatible international standards and needs.

*IMPORTANT INFORMATION - * for M2M Pro 3 IO® only, ** not available for MyGuard Hub®, *** for M2M Pro 3 CONCENTRATOR® only, **** for MyGuard Hub® only*

INSTALLATION STEPS

- *Step1:* Switch off the electric connection - if it was already connected – then insert an activated SIM card into the SIM bay [4] socket (the cutted side of the SIM-card must be inside and the chip-side of the SIM-card looks to the M2M Pro3's PCB circuit). Push to fit the card.
- *Step2:* Mount the SMA antenna connectors [9] regarding the antenna type titles on the device
- *Step3:* Connect the 12 VDC Power supply adapter wire into the the Power supply connector [1] of the device
- *Step4:* Connect the Ethernet UTP cable to the connector [8] of the M2M Pro3 and the next side of the cable to Your computer. Then You can access the web administration interface for configuring the router regarding the User Manual (from a web browser at the http://192.168.127.1:8080 address (user: *admin*, password: *password*))
- *Step5:* If You use the Pro3 IO® version and You'd like to use the wired connections, You have to connect them [10], [11], [12], [13], [14] with the current wires and the outer device.
- *Step6:* If You'd like to use memory card to the [3] or a USB pendrive at [5] connect them.
- *If You would like to use the default configuration, just push the [7] button, please.*

OPERATION STATUS LEDS

LED	Function	Device state	LED
St.	Power on status	lights when its started and boot is on the way	green
GSM/HSxPA	2G/3G signal strength & status	blinks if connection is on the way, lights if comm. is okay	red
WiFi	WiFi active status	blinks when WiFi is under registration, lights if the WiFi operates and SSID available	green

PACKAGE CONTENT

M2M Pro 3® / **M2M Pro 3 CONCENTRATOR®** / **M2M Pro 3 IO®** / **M2M Pro 3 WiFi®**/ **MyGuard Hub®** router, 1/2/3 comm. antenna, 12V power supply adapter, Quick Guide Reference document, Warranty Card. In Case of **MyGuard Hub® security** sensors, remote controller, power plug are also packed.

CERTIFICATIONS

The device compliance with the CE certification directives with the following standards and partly accomplish to the further standards and rules:
RF Spectrum: ETSI EN 301 511 V9.0.2, ETSI EN 301 908-1 v3.2.1
EMC: ETSI EN 301 489-1 V1.4., ETSI EN 301 489-4:2000-08, ETSI EN 301 489-7 v1.3.1, ETSI EN 301 489-7 v1.3.1, ETSI EN 61000-1:2010, ETSI EN 61000-3-2/3, ETSI EN 61000-4-3/6/11, ETSI EN 61000-6-1/4, ETSI EN 55022:2006+A1:2007, ETSI EN 55024:2003, ETSI EN 50130-4, ETSI EN 300 328, ETSI EN 302 291
Mobile device compliance: 3GPP TS 51.010-1 V4.3.0, ETSI EN 300 220-1 and FC part 15.247 & 15.249 directives
M2M technology: ETSI TR 102 691, **Smart Metering:** ETSI TR 50572:2011, ETSI TR 102 886 V1.1.1, **Wireless remote metering:** ETSI EN 13757-2:2004, ETSI EN 13757-3:2004, ETSI EN 60870-5-101, ETSI EN 60870-5-102, ETSI EN 60870-5-103, ETSI EN 60870-5-104, ETSI EN 60870-5-1, **M-Bus:** ETSI EN1434-3, **Wireless M-Bus:** ETSI EN 13757-4:2005, **IEEE Standard 802.15.4 (Zigbee):** ETSI IEC 60870, 61868-70
IEEE Standard 802.11b,g,i,n (WiFi): ETSI EN 302 544, **IEEE Standard 802.3 (Ethernet):** ISO/IEC 8802-3, **ISM Standard (RF 868MHz):** ETSI 302 208-1, ETSI 302 208-2
2G, 3G network standards: GPRS/GSM network (IP): IEC 62056-62 / 6-61, **EDGE:** ETSI EN 301 489-50 V1.2.1, ETSI EN 301 908-8/9, **UMTS: ETSI** ETSI EN 301 123, ETS 300 905, ETSI TR 123 909, **HSDPA:** TS 125 317, TS 125 308, **HSUPA:** TS 125 101, LTE: TS 136 141
TCP/IP communication: IEC 62056-53, ETSI EN 302 665 V1.1.1, **TCP/UDP server comm.:** TS 102 483 - V7.1.0
Security compliance: ETSI EN 50131, ETSI EN 50164, ETSI EN 62305-4, ETSI EN 50130, **Alarm signal transmitting device compliance:** ETSI EN 50136-1-1/2/3/4/5:2006, **Signaling and remote monitoring solutions compliance:** ETSI EN 50134, **Intrusion and defensive systems compliance:** ETSI EN 50131-1, **Alarming system compliance:** ETSI EN 50131-5-3:2005+A1:2008, **Alarming system environmental conditions:** ETSI EN 50130-5, **Alarming system and intrusion & prevention systems, part 3. Control and display:** EN 50131-3:2009 , **Alarming system and intrusion & prevention systems, part 7. Application regulations:** CLC/TS 50131-7:2010, **Central monitoring & surveillance signal receiver systems:** ETSI EN 50138-1/2/3, **Alarming system and intrusion & prevention systems, power supply:** ETSI EN 50131-6:2008, **Emergency call systems:** ETSI EN 50133-1/2/3/5/7, **Alarm systems – passive infrared sensors:** ETSI EN 50131-2-2, **Alam systems – combined IR and microwave sensors:** ETSI EN 50131-2-4
Digital Video Broadcasting (DVB): ETSI ES 202 218, **Video streaming:** ETSI EN 50132-5:2001, **Video surveillance:** ETSI EN 50131-1:2006/A1:2010, ETSI EN 50132-1:2010
Safety & Health: ETSI EN 60950-1:2006+A1:2010, ETSI EN 50371:2002, **Environmetal Testing:** IEC 60068

CE FC

This product assigned with CE symbol according to the European regulations. This symbol on the product or packaging means that according to local laws and regulations this product should be not be disposed of in the household waste but sent for recycling. Please take it to a collection point designated by your local authorities once it has reached the end of its life, some will accept products for free. By recycling the product and its packaging in this manner you help to conserve the environment and protect human health.